
# LEADERSHIP CRITERIA UNDER MAXIMUM PERFORMANCE CONDITIONS

THESIS

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## Abstract

Since the seminal work investigating the relationship between typical and maximum performance by Sackett, Zedeck, and Fogli in 1988, there has been a marked increase in research in this area. Although much research has furthered the relationship between typical and maximum performance, none have attempted to identify which leadership effectiveness criteria are considered most important to an individual's maximum performance, or assessment of one's potential. Thus, this empirical study seeks to identify the leadership effectiveness criteria under maximum performance conditions as it relates to entry and middle level managers.

Using an exploratory factor analysis, the results suggest an interesting comparison of leadership criteria between entry and middle management engaged in maximum performance. For entry level managers, personality, effort, and attitude emerged as the most important factors. Taken together, these factors suggest that "leadership of self" describe the pathway to being an effective leader. However, for middle level managers, trust, accommodation, and adaptability were considered essential leadership effectiveness criteria indicating "leadership of team" is an appropriate framework at this level.

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Aaron J. Pauli

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## I. Introduction

Over the past century, there has been an explosion of interest in the topic of leadership. Often, it is linked to performance and managerial potential (Ployhart, Lim, & Chan, 2001). Moreover, it is highly regarded as critical to success in military environments (Bass, 1998; Campbell, McHenry, & Wise, 1990). Accordingly, there has been a great deal of attention in both academic and popular literature originating from earlier conceptions captured by trait theory to the most recent and highly studied model described as transformational leadership. Regardless of industry, organizations are fascinated by the concept of leadership and its ability to influence others to achieve organizational goals.

Many organizations invest resources in leadership training by inviting speakers to share their ideas on leadership, sending their employees to leadership training schools (i.e. assessment centers), or providing other activities perceived necessary to hone employee leadership skills. Moreover, managerial performance assessment is frequently based on the ability to perform job functions, work effectively in teams, and lead others. When performance is measured over a longer period of time, as in annual performance appraisals, the type of performance is described as typical performance (Sackett, Zedeck, & Fogli, 1988). However, if an individual is being evaluated whereby the individual is made aware of the evaluation, the highest level of effort is expected, and the assessment is over a shorter period of time compared to typical performance, then the level of performance is described as maximum performance (Sackett et al., 1988).

The underlying goal of typical performance is to determine what an employee *will* do while the goal of maximum performance measures is to determine what an employee *can* do. Cronbach (1960) was the first to make this distinction when he referred to maximum performance as "tests of ability" and typical performance as what an individual is "likely to do in a given situation or in a broad class of situations" (Cronbach, 1960, p.29). This distinction is important especially to organizations that utilize both typical and maximum performance methods as a means to develop and select employees for hiring or advancement potential.

Understanding which dimensions are important to leadership development is a key component to understanding and improving organizational effectiveness (Benson, 2007). However, previous research does not seem to address which leadership dimensions are considered fundamentally relevant to maximum performance conditions. Instead, much of the attention has only been devoted to deductively testing the impact of a priori dimensions under these conditions. Moreover, these studies are often analyzed by asking subjects themselves about their thoughts and perceptions rather than determining which leadership dimensions should be considered relevant to maximum performance in the first place. Accordingly, little work seems to address the differences between entry and middle level managers exposed to maximum performance conditions which is only possible when raters are asked to uncover these characteristics themselves. Thus, the following problem statements exist:

*What are the leadership effectiveness criteria under maximum performance conditions?*

*What are the differences in leadership effectiveness criteria between entry and middle level managers under maximum performance conditions?*

## Methodology

In order to identify potential leadership dimensions that pertain to maximum performance conditions, an appropriate venue that sufficiently represents the conditions outlined by Sackett et al. (1988) must be selected. Assessment centers have frequently been cited as fertile ground for research since their inception during the 1940s (Lance, 2008) and have been identified as appropriate methodologies to simulate maximum performance conditions (Ployhart et al., 2001; Bradley, Nicol, Charbonneau & Meyer, 2002; Lim & Ployhart, 2004). Often, they are used for personnel selection and promotion (i.e. administrative assessment centers) and training (i.e. developmental assessment centers) in both private and public sectors (Thornton & Rupp, 2006; Lim et al., 2004). Accordingly, the military has used such assessment centers as a mechanism to train new and experienced officers alike to develop their leadership skills and select top performers as a means of recognition and career benefit. Such an application of assessment centers has been acknowledged by the research community and simultaneously serves as a useful mechanism to study leadership under maximum performance conditions. Thus, the Air Force's leadership training school for entry level officers—Air and Space Basic Course (ASBC)—and its middle manager leadership school—Squadron Officer School (SOS)—were the developmental assessment centers used in this study to identify leadership effectiveness criteria under maximum performance conditions.

Often, leadership is considered an important component to an individual's organizational performance (Borman & Brush, 1993; Campbell et al., 1993). Thus, it is essential to develop appropriate leadership dimensions that can be used to accurately assess the criteria considered important to performance. However, the process of identifying relevant leadership criteria can be problematic if it lacks the necessary academic rigor to support the findings. Accordingly, a deficient process could easily create espoused constructs that misrepresent such leadership effectiveness criteria and jeopardize the ability to assess the intended leadership dimensions accurately or in a meaningful way. Traditionally, this has been referred to as the construct validity problem (Lievens, 2002).

There has been much debate about the construct validity problem associated with assessment centers. Lance (2008) argues that high correlations commonly observed between constructs and exercises suggest that assessment centers are actually measuring exercise-specific behaviors rather than construct-specific behaviors. Yet, Howard (2008) discusses how it should not be surprising that both exercises and constructs have been observed to covary because exercises are designed to elicit behaviors that can be used to rate intended constructs. Moreover, Howard (2008) suggests that since exercises can elicit both intended as well as unintended behaviors, it is quite possible for ratings to reflect both intended and espoused constructs.

Whether constructs have been observed to reflect exercises or not, Arthur, Day, & Woehr (2008) suggest that raters and assessment center research seem to accept the use of espoused constructs. Furthermore, they argue the root of the construct validity

problem is the inappropriately developed and tested construct development process for assessment centers. As a means to alleviate this concern, Arthur et al. (2008) propose the idea that assessment centers need to ensure that each construct intended to be measured is subject to the rigor of a psychometric test to ensure the constructs intended to be rated are in fact, being rated. Accordingly, this study followed an academically rigorous procedure (Thornton & Rupp, 2006) in sync with the most contemporary research of dimension development to derive appropriate leadership criteria and thus, avoid the rating of espoused constructs.

**Implications**

Identifying leadership criteria under maximum performance conditions for entry and middle managers is significant to both practitioners and academics alike. There has not been a study to date that has gained insight on leadership criteria relevant to maximum performance conditions. While there have been studies that analyzed a priori leadership dimensions under such conditions, there have yet to be any that provide answers to the question of which leadership dimensions are considered important in the first place. Needless to say, there has also not been such a study that has leveraged trained experts to uncover maximum performance leadership dimensions—a critical factor to ensuring only appropriate dimensions are developed. Moreover, there has not been a study that has distinguished leadership effectiveness criteria under maximum performance conditions between entry and middle levels of management. Such a contribution to the research may provide invaluable insight for practitioners to not only differentiate between entry and middle level managers' leadership, but also provides

information on what entry and middle level managers can do at a specified level of experience. Accordingly, the results of this study can be used to help shape the selection, promotion, and placement process of entry and middle level management within organizations. Finally, this study sheds light on maximum performance research by introducing significant leadership analysis to the body of knowledge.

## II. Literature Review

Originally conceived by Cronbach (1960) and popularized by Sackett et al. (1988), researchers have continuously tried to gain insight into the relationship between typical and maximum performance. While maximum performance conditions were initially studied using objective measures of speed and accuracy of cashiers' ability to checkout customers during peak supermarket conditions and under supervisor review (Sackett et al. 1988), there has been a wide variety of research to attempt to further the discussion.

### Maximum vs. Typical Performance

As briefly discussed earlier, maximum performance refers to what an individual can do over a shorter, specified period of time and typical performance refers to what an individual will do in the long run. Sackett et al. (1988) proposed the often cited three conditions considered necessary to exert maximum performance: 1) the individual is made aware of an evaluation 2) the individual must understand that maximum performance is expected and therefore exhibit maximum effort, and 3) there must be a short enough time span such that the individual is capable of providing maximum effort. Regarding typical performance, Sackett et al. (1988) describe such conditions as performance evaluated over a regularly scheduled period of time (e.g. annual performance report) whereby maximum effort is a conscious endeavor, strictly communicated to the individual, and monitored throughout the rating period. Sackett et al. (1988) supported their findings for the relationship between maximum and typical

performance using the results from a supermarket experiment in which cashiers were exposed to objective evaluations of speed and accuracy of checkout via a short term sampling of the job and a 30 day review. Their findings suggested very low correlations in performance between short term (i.e. maximum performance) and long term (i.e. typical performance) evaluations (.14 and .32 for the speed evaluation and .11 and .17 for accuracy).

In a more recent commentary on the seminal Sackett et al. (1988) article, Sackett (2007) seeks to provide additional clarification of the three conditions necessary for maximum performance. In hind sight, he confesses that instead of using the word "necessary" originally used in 1988 to describe the three conditions, he prefers the word "sufficient" be used. Moreover, he mentions the intentionally vague "short duration" condition to avoid placing overly restrictive constraints and to provide opportunities to research this topic. Thus, the three conditions help grant assurance that the performance in question is indeed *most likely* to be a maximum performance and that if any conditions are absent, it's not that the potential for maximum performance is lost, but that that it is reduced to an unknown state (Sackett, 2007). However, because this study leveraged the earlier, more restrictive definition of maximum performance, there is little doubt in the ability of ASBC or SOS to represent maximum performance conditions.

The discussion of maximum and typical performance has focused on a wide variety of applications as highlighted by Dubois, Sackett, Zedeck, and Fogli (1993) to include the implications of generalizing typical performance to maximum performance situations, problems associated with maximum and typical performance (Campbell et al.,

1990; Guion, 1991; Sackett & Larson, 1990), utility analysis (Boudreau, 1991), implications of job knowledge and cognitive ability tests (Ackerman & Humphreys, 1990; Dubois et al., 1993), confounds affecting criterion validity (Borman, 1991), the five factor model of personality and transformational leadership (Ployhart et al., 2001; Lim et al., 2004), personality and cognitive ability (Bradley et al., 2002; Marcus, Goffin, Johnston, & Rothstein, 2007), maximum performance dimensions as an accurate representation of task priorities, situational constraints, and criterion data sources (Mangos & Arnold, 2008), impact of "dark" and "light" constructs (Benson & Campbell, 2007), and a host of other a priori psychological constructs investigated across the maximum and typical performance continuum (Scholtz & Schuler, 1993). While many studies have attempted to expand on maximum and typical performance, no studies to date have included an inductive study to determine leadership criteria under maximum performance conditions or as these criteria relate to entry and middle management leadership.

**Assessment Centers**

As previously mentioned, assessment centers have been shown to be an appropriate venue to represent maximum performance conditions. Accordingly, ASBC and SOS simulate such a performance environment as determined by Sackett et al. (1988) for both entry and middle level managers. ASBC is a six week training program that expressly encourages entry level managers to maximize their performance throughout the course. SOS is a five week course that parallels the characteristics of ASBC but is tailored to middle level managers. Moreover, a distinguished graduate program exists in

each assessment center to reward the highest performing individuals. Beyond encouragement from assessment center staff, the distinguished graduate program further incentivizes students to perform to the best of their ability because it nearly guarantees advancement for the next 10 years. Thus, the students at each assessment center are made acutely aware of their evaluation, explicitly encouraged to exert their highest effort, and are assessed over a considerably shorter duration than annual performance reports that capture typical performance. Taken together, clearly the assessment center conditions at ASBC and SOS fit the maximum performance conditions outlined by Sackett et al. (1988).

**Leadership Dimension and Criteria Development**

While studies have indicated the usefulness of assessment centers (Gaugler, Rosenthal, Thornton, & Benson, 1987; Arthur, Day, McNelly, & Edens, 2003), one of the important considerations that should precede their use is the issue of construct development, or dimension development as it is often referred to in an assessment center setting (Thornton & Rupp, 2006). As previously mentioned, without a meticulous methodology to develop appropriate dimensions for assessment centers, there is a significant risk of rating dimensions that inaccurately represent leadership effectiveness criteria (Arthur et al., 2008). By engaging in a rigorous dimension development process for ASBC and SOS, this study intends to alleviate this concern and mitigate the possibility of rating espoused dimensions instead of the actual dimensions intended to be rated (Arthur et al., 2008).

A variety of procedures have been used to develop appropriate dimensions to include the use of previous research, job analyses, surveys, interviews, and questionnaires (Henderson, 1976). For example, in an attempt to discover which dimensions are important to assessment centers, Arthur et al. (2003) analyzed 179 articles and manuscripts which led to the identification of 168 dimensions. Additionally, Arthur et al. (2008) suggest that dimensions should be developed according to their ability to reflect a variety of validity evidence to include content, criterion, and construct validity as a few types of evidence to consider. Moreover, it has been suggested that *quality* of such validation evidence (e.g. test-criterion relationships, content, internal structure of the test, response processes, and consequences of testing) should play a key role in weighing the contribution of each source to validity (SIOP, 2003). Thornton and Rupp (2006) highlight that an important first step to identifying dimensions should be a job analysis. In their discussion, they discuss how an assessment center job analysis is broader than a traditional job analysis in that an assessment center job analysis extends beyond knowledge, skills, and abilities (KSAs) and other organizational characteristics (KSAOs) by involving "several components of the job situation, such as the dimensions required, the relative competency required for each dimension, the job tasks, and the organizational environment" (Thornton & Rupp., 2006, p.81). Thus, they argue that this broader sense of job analysis should be used because of its ability to uncover the complexities inherent in an assessment program (Thornton & Rupp, 2006). When considering potential processes to use for dimension development, it was determined that a compilation of these methods would be the most appropriate process.

Such a rigorous process is consistent with the one proposed by Thornton and Rupp (2006) in which potential behavioral dimensions are identified by conducting a job analysis using information about the job, consulting subject matter experts, acquiring and analyzing data stemming from expert consensus, and documenting the findings that emerge from the common factors. In particular, they point out that successful assessment centers have been careful to create dimensions that were rooted in a job analysis or job competencies composed by key contributors to performance (Thornton & Rupp, 2006).

The strategy proposed by Thornton and Rupp (2006) for a job analysis to uncover KSAs and KSAOs can also be applied to the development of leadership effectiveness criteria insomuch as these job criteria are the relevant KSAs and KSAOs of leaders. Regarding key contributors to performance, Thornton and Rupp (2006) consider a multitude of methods that can be used ranging from direct observation or participation to interviews with subject matter experts, trainers, instructors, or educators. They consider experts to be individuals that have experience, are well trained and capable of providing insights into the jobs of interest, and able to accurately rate trainee behaviors. Moreover, there should be a means to provide feedback to trainees. Ideally, these experts should reach consensus through either discussion or statistical formula. Furthermore, they assert that precautions should be taken to mitigate potential biases that may interfere with collected data used to compose appropriate dimensions. Once data is acquired, it must be analyzed to formulate appropriate behavioral dimensions. Finally, documentation of dimension development is an important step to create flexibility and facilitate the periodic

review of assessment center design and the associating dimensions deemed relevant to the organization (Thornton & Rupp, 2006).

**Experts vs. Novices**

When it comes to level of rater expertise, someone with a high degree of proficiency is regarded as an "expert." Contrarily, one who lacks proficiency is regarded as a "novice." Accordingly, expertise can be conceptualized as a continuum such that experts and novices are at each extreme (Chi, 2006) and proficiency as the level of training and experience acquired. Moreover, Schenk, Vitalari, and Davis (1998, p.13) characterize experience in terms of "episodic knowledge" which is defined as:

> "…the organized collection of specific job-relevant events or situations (i.e., episodes) that becomes a source for future problem solutions. Moreover, this episodic knowledge, if it exists at all in the novice, is superficially organized compared with that of the experienced professional…Thus, while the novice may have a great store of semantic or factual knowledge, including the latest techniques, research results, and critical issues, he or she is sorely lacking in grounded, domain-specific knowledge."

Schenk et al. (1998) also suggest that experience alone is insufficient and that other factors such as awareness of one's decision-making and ability to monitor the decision-making process are also important. However, training can be considered an effective solution to refine the decision making process and bolster decision making. Taken together, training and experience increase proficiency which is required to become an expert.

### *Instructors as Experts*

When deciding which audience would be most appropriate to collect data, it was evident that ASBC and SOS instructors could be regarded as experts given their level of training and experience. Upon selection, instructors are required to attend five weeks of training consisting of two courses and a week of supervised instruction. The two training courses, theory and principles of adult education (TPAE) and practical application of adult education (PAAE), are each two weeks long and cover a range of topics including instructional methodologies, lesson presentation skills, classroom management, educational evaluation, assessment processes and requirements, and supervised instruction exercises. The fifth week of training requires each instructor to conduct a class under the supervision of a fully qualified instructor who has been appointed based on ability to exhibit the highest teaching standards. Once the five weeks of initial training are completed, additional refresher training is completed during an instructor's first class, annually thereafter, or upon request of instructors. Furthermore, an 80 hour supplementary training course and other workshops are provided for instructors to improve instructional design, curriculum development, presentation and delivery, and assessments. Throughout the extensive training provided, instructors are expected to demonstrate subject matter expertise, be able to provide quality feedback and assessments of students, and communicate effectively. To enforce these standards, instructors are subject to mandatory faculty evaluations by supervisors, their students, and optionally by peers. These evaluations are a critical feedback mechanism that continuously reinforce and uphold the decision making framework and skills demonstrated by experts.

Regarding experience, only officers with at least four years of time in service for ASBC and eight years for SOS are considered for instructor selection. Additionally, instructor selection is contingent on the ability of the officer to meet initial qualifications consisting of previous instructor experience, ability to exceed performance standards, professional military education completion, and progress or completion of a master's degree. Collectively, the initial and ongoing training and experience provide instructors with the necessary skills to continuously refine their decision making mental model and exhibit the level of proficiency that is indicative of an expert.

### *Advantages of Experts*

There are several advantages to using experts in this study as a means of identifying leadership criteria. Experts have been observed to perform better under time constraints, more accurately than non-experts, and are able to structure problems and categorize concepts better than novices (Chi, 2006; Guerrero, Gou, and Arnau, 1997). Moreover, Anderson and Lienhardt (2002) found experts could identify solutions immediately and were able to recall cognitive rules better than novices. Gitomer (1988) and Glaser (1990) discuss in detail the advantageous ability of experts to use more accurate mental models to process high volumes of information and that the ability to recall information is at a faster rate than less skilled individuals. Keeney and von Wintderfeldt (1991) assert that "throughout any analysis, expert judgment is essential (p.191)." Thus, given the choice between experts or novices to collect data on leadership performance, the literature clearly favored the use of experts which in turn, more appropriately described the instructors consulted in this study.

### *Disadvantages of Experts*

While there is extensive research covering the advantages of experts, there is comparably less mention of the limitations of experts. Chi (2006) points out limitations such as how experts have a hard time adapting to areas outside their areas of expertise, tend to be overconfident in their abilities, and overlook the less relevant matters of a subject more than novices. Additionally, Hinds (1999) found that experts may not be as good at predicting as novices. Furthermore, Chi (2006) discusses the potentially greatest limitation of experts to be bias which tends to be more of a factor in experts than novices. Keeney et al. (1991) point out that the three most important bias considerations when eliciting information from experts are overconfidence, anchoring, and availability. They define overconfidence as having "more certainty in judgments than is appropriate", anchoring as placing too much "focus on an initial value" followed by "insufficient adjustment" to additional information, and availability as "overemphasis of events that are easily imagined or recalled (p. 199)." However, this bias was mitigated using the nominal group technique to obtain data from the experts in this study.

## Nominal Group Technique

Although a variety of methods used to obtain dimension data from experts can be used such as brainstorming, Delphi technique, voting, interviews, surveys, the nominal group technique was selected as the most appropriate method in this study. Reasons for this choice include the ability of nominal group technique to generate the highest volume of ideas (Dunnette, Campbell, & Jaastad, 1963), reduce expert bias (Culbert, 1968), and

obtain quality data given a limited amount of time (Delbecq & Van de Ven, 1971). Additionally, it has been shown to be a superior method over brainstorming by producing more ideas and with greater variety (Bartunek & Murninghan, 1984) and there is a smaller chance of groupthink because non-dominating contributors get to voice their inputs to the facilitator but dominating members have to wait their turn (Heldman, 2005). However, the group interaction that occurs during brainstorming may serve as an appropriate means of priming the members prior to exercising individual effort or non-interacting nominal groups (Dunnette et al., 1963; Keeney et al., 1991).

Although nominal group technique has been observed to "produce high quality alternatives, more accurate decisions on structured problems, lower costs, stronger feelings of accomplishment, more implementation attempts, more satisfaction, and fewer negative socioemotional behaviors than free-flowing group problem-solving procedures" (Bartunek et al., 1984, p. 418), a few limitations have also been noted and addressed. For example, Bartunek et al. (1984) pointed out the potentially stifling structure of nominal group technique to only produce one solution, the inadequacy to reach consensus for poorly defined problems, and the inability to reformulate the initial problem statement once the process has begun. Thus, they suggest that nominal group leaders should engage in additional steps of reflection during the process to ensure the complexities of a problem statement are satisfactorily addressed by the group. Another potential problem Bartunek et al. (1984) point out regarding nominal group technique may be lack of familiarity with the process and perhaps preference for more free flowing discussions similar to brainstorming. However, such an issue can be overcome by prefacing the process with a well-communicated description of what nominal group technique is and

the benefits it has shown over other techniques like brainstorming (Bartunek et al., 1984). Accordingly, prior to its implementation in this study, a detailed explanation of nominal group technique as outlined by Delbecq et al. (1971) was communicated to the participants.

**Mixed Methods Approach**

From inception (Campbell & Fiske, 1959) to more modern applications (Creswell, 2002), the mixed methods approach has been increasingly popularized. The mixed method approach utilizes both quantitative and qualitative approaches during the phases of research in which an integration of these methods is beneficial (Creswell, 2002). As Creswell (2002) asserts, the mixed methods approach has been recognized for its ability to synthesize findings acquired from different data sources and gain additional research insight when single method approaches fall short. Creswell (2002) suggests how the mixed methods approach is often easiest to implement when conducted in sequentially (e.g. qualitative followed by quantitative) rather than concurrently (e.g. qualitative and quantitative simultaneously). Moreover, he provides examples of mixed methods approaches to include the use of both open ended observations and close ended measures to converging multiple forms and sources of data such as statistical analyses and descriptive information (Creswell, 2002). Accordingly, this study is representative of the mixed methods approach because of data collection obtained through focus groups followed by surveys to develop leadership criteria under maximum performance conditions. Using this approach was beneficial to gain insight on which dimensions were considered most important to leadership effectiveness.

## III. Method

A mixed methods approach was employed as a means of converging data obtained from both focus groups and surveys. More specifically, a sequential mixed methods strategy as suggested by Creswell (2002) was used for data collection such that the data extracted from focus groups was followed by a survey to confirm the identification of the most important leadership criteria under maximum performance conditions.

The procedure used in this study started with data collection from instructors who qualified as experts and thus were considered most capable of contributing meaningful inputs that related to leadership performance. These experts were sent an initial survey as a means of preparing their minds for eventual focus group participation. The focus groups were conducted using the nominal group technique which served to mitigate potential biases and obtain inputs that could be used to formulate the structure of the proposed maximum performance leadership dimensions. Once the data from each assessment center were compiled, each focus group input was reviewed by three trained subject matter experts to ultimately determine a psychological dimension that appropriately captured each input provided. The result of this review was a list of leadership dimensions that was used to create a second survey which asked instructors to rate the importance of each dimension relative to a student's performance. Finally, an exploratory factor analysis was conducted on the top ten leadership dimensions for each assessment center as a means of uncovering the leadership effectiveness criteria.

## Setting

Participants for this study were officers in the United States Air Force assigned as instructors at Air and Space Basic Course (ASBC) and Squadron Officer School (SOS)—both of which are developmental assessment centers designed to educate and improve the leadership of officers. Each school caters to a level of management in the Air Force that is determined by years of experience and scope of job responsibility. ASBC is a six week long course intended for officers with less than one year time in service while SOS is a five week long course tailored to officers who have at least four years to seven years time in service with similar managerial experience. Thus, entry level management describes ASBC students while those enrolled in SOS are better characterized as middle level management. Such a cutoff point is similarly assigned in the study of cross-cultural perceptions of middle management conducted by Neelankavil, Mathur, and Zhang (2000). Students arriving at both ASBC and SOS represent a wide range of jobs spanning pilots and navigators to developmental engineers and scientists.

## Sample

A total of 37 ASBC instructors and 33 SOS instructors participated in the data collection procedure. ASBC instructors represent middle level managers with four to seven years experience while SOS instructors represented more senior level officers with nine to twelve years of experience. As mentioned previously, these instructors were considered experts given their training and experience related to specific job relevant events and situations.

## Identifying Leadership Effectiveness Dimensions

### *Focus Group Preparation*

Identifying potential dimensions started with focus group preparation. Careful consideration was taken to ensure that potential dimensions were necessarily supported by evidence from instructor inputs. Thus, prior to the focus groups, instructors were sent a survey asking them to list training events that best helped them decide who was a good (or bad) leader. Next, they were asked to list the specific behaviors that occur (or do not occur) during each of the events which help them to assess the proposed behaviors. Both sets of questions were open ended to ensure an unrestricted range of answers. Additionally, instructors were given extensive training of how each exercise works and the expected behaviors that students exhibit when performing the exercises. Thus, there was reduced risk that potential behaviors or events were excluded from consideration. The results were compiled from these surveys to obtain a baseline of information that could familiarize the researchers in this study for eventual focus group discussions. More importantly, such an approach served as a way to prime the minds of the experts for the focus groups and has been expressed as a beneficial precursor to using the nominal group technique as a means to facilitate consensus in focus groups (Dunnette et al., 1963).

### *Focus Group Process*

Focus groups were chosen as a venue for the nominal group technique to gain consensus given the limited amount of time of instructors and their availability to provide inputs. To facilitate the focus groups, the nominal group technique was used since it has

been empirically supported (Dunnette, 1963) and has been described as one of the best and most efficient means of producing quality inputs in a group setting (Bartunek, 1984). Using the procedures outlined by Delbecq and Van de Ven (1971), the focus groups were formed in groups of 4-8 instructors. Six focus groups were formed for ASBC using 37 instructors and four groups were formed for SOS using 33 instructors. During the focus groups, participants were asked to: 1) list as many characteristics of a low performing student as they could and 2) similarly for a high performing student. For each question, the group was given enough time (typically 20-30 minutes) of silence to write one input on a single piece of paper that they felt answered the question. Moreover, it was emphasized to the instructors that the characteristics must be tied to performance. At the end of this segment, inputs were solicited by each instructor one at a time. Inputs were systematically provided by rotating between each member of the group. Each input was visibly displayed by posting it on an easel. Additionally, each input was subject to the debate of the team. Inputs that were rejected were also visibly posted for the group's reference. If a duplicate input was shared by another member of the team, both inputs would be combined and similarly displayed on the easel. As a means of categorizing conceptually similar inputs, headings were debated and established by the group to identify the ones that most appropriately captured the inputs. When a question was sufficiently saturated with inputs or when time warranted each session, the next question would be introduced. The final result was a list of behaviors deemed critical to the performance of a student.

Using the nominal group technique elicited the best inputs because it provided a group of experts an opportunity to write down their answers before being asked to provide inputs one-by-one resulting in a wide range of expert inputs. Once inputs were provided, all of the instructors were given the chance to provide feedback regarding each input. Moreover, such a process encouraged experts to contribute their highest effort since each member was able to directly observe how their specific input impacted the quality of the study (Keeney et al., 1991). The result of this process was a list of characteristics considered to be most relevant to the job. Additionally, non-dominating personalities were able to voice their inputs just as much as more dominating members. This particular feature of the nominal group technique was critical to reduce bias and counteract groupthink (Heldman, 2005).

### *Focus Group Data Analysis*

The focus group data analysis was achieved in three phases. The first phase involved compiling the focus group data for analysis. A total of 347 ASBC inputs (174 high performer and 173 low performer) and 178 SOS inputs (82 high performer and 96 low performer) were inputted into a database. Additionally, the headings established during the focus groups for each set of inputs were similarly entered into the database. The second phase consisted of determining appropriate dimensions that encompassed the idea behind each instructor's input. This was achieved using three trained subject matter experts (two industrial-organizational PhD psychologists and one management PhD) to analyze the data. Each input was reviewed and assigned potential dimensions that encapsulated the comment. To reduce potential availability bias, the previously

established focus group headings were hidden from view during this phase of the analysis. The third phase consisted of selecting a final dimension by comparing the focus group headings with the potential dimensions identified during phase two. These final dimensions were selected according to their ability to most closely resemble the focus group headings (and therefore set of inputs) to ensure alignment with the intention of the focus group inputs (the context). The finalized listing of dimensions was then collapsed further to combine the multiple instances in which identical dimensions emerged. The result of this phase determined the number of dimensions derived from the focus group inputs. A total of 63 dimensions emerged from the ASBC focus group inputs and 97 dimensions were formulated for SOS.

A second survey was then assembled and disseminated using the dimensions describing ASBC and SOS. Specifically, this survey consisted of the total number of dimensions along with a brief characteristic that concisely described each dimension. These characteristics were derived from items used to measure each dimension. The instructors were asked to rate on a scale of 1-10 how important they thought each characteristic was to determining a high performer. Similarly, for negative dimensions, e.g. counterproductive work behavior, the instructors were asked to rate on a scale of 1-10 how destructive they thought each characteristic was to the performance of a trainee. Finally, the results from this survey were inputted into a database to identify the overall relative importance of each dimension.

**Identifying Leadership Effectiveness Criteria**

To identify leadership effectiveness criteria, the mean ratings were used to rank the dimensions in terms of importance of behaviors to performance as viewed by the instructors. Once a complete listing of dimensions for ASBC and SOS were rank ordered, the top ten dimensions from each assessment were compared by conducting an exploratory factor analysis and interpreting the results using a varimax rotation. Only substantively important factors were retained based on the Kaiser (1960) criterion of retaining factors with eigenvalues greater than one. After suppressing results less than .4 as proposed by Stevens (2002), two dimensions from SOS were discarded due to persisting cross-loading. The factor analysis yielded three factors for ASBC and three factors for SOS .

## IV: Analysis and Results

As previously discussed, rigorous dimension development was necessary to identify appropriate leadership effectiveness criteria. The result was a list of dimensions derived from expert inputs consisting of leadership behaviors deemed relevant to maximum performance. Although ASBC yielded 63 dimensions and SOS had 97, a cutoff was made between the two assessment centers in order to compare the most significant differences. Accordingly, the top ten dimensions ranked by mean importance were used for further analysis to determine these meaningful differences. Below, **Table 1** highlights the highest rated dimensions and associated characteristics for ASBC and **Table 2** displays the same information for SOS:

| **Dimensions:** | **Characteristics:** |
|---|---|
| 1. Counterproductive Work Behavior | 1. Exhibits active negative behaviors |
| 2. Integrity | 2. Conveys a clear sense of integrity |
| 3. Negative Affect | 3. Degree to which student exhibits a negative attitude |
| 4. Honesty | 4. Willingness of the student to be honest |
| 5. Mastery Orientation | 5. Desire to do the best job possible in all areas |
| 6. Idealized Influence | 6. Ability to act as strong role model and make others want to follow |
| 7. Conscientiousness | 7. Attention to detail; awareness of what needs to be done and prepares accordingly |
| 8. Engagement | 8. Willingness to actively participate and remain engaged in activities |
| 9. Verbal Communication | 9. Ability to effectively communicate verbally |
| 10. Effort | 10. Lack of effort applied |

**Table 1: Top Ten Dimensions and Associated Characteristics for ASBC**

| **Dimensions**: | **Characteristics**: |
|---|---|
| 1. Followership | 1. Ability of student to follow as well as lead |
| 2. Feedback Acceptance | 2. Willingness to accept feedback |
| 3. Meta Cognitive Prompting | 3. Ability to provide strong and clear direction |
| 4. Trustworthy | 4. Degree to which student is trustworthy |
| 5. Selflessness | 5. Degree to which student is selfless |
| 6. Cognitive Adaptability | 6. Inability to adapt to new information or environmental factors |
| 7. Developing Team Members | 7. A team player; willing to encourage and support teammates to increase their effectiveness |
| 8. Introspection | 8. Ability to self-critique to understand what is needed to be worked on |
| 9. Honesty | 9. Willingness of the student to be honest |
| 10. Verbal Communication | 10. Ability to effectively communicate verbally |

**Table 2: Top Ten Dimensions and Associated Characteristics for SOS**

## Exploratory Factor Analysis

An exploratory factor analysis using SPSS was conducted on the mean importance of dimensions as rated by each instructor. However, to ensure there was support for the use of an exploratory factor analysis for uncovering leadership criteria, a series of statistical tests were conducted. Sampling adequacy was determined using the Kaiser-Meyer-Olkin (KMO) test which resulted in values of .635 for ASBC and .690 for SOS (i.e. well above the acceptable limit of .5 (Field, 2009)). Bartlett's test was used to ensure sufficient correlations between dimensions existed and found that each dimension

was less than .05 for each assessment center (i.e. .000 for both ASBC and SOS) indicating the correlations between each variable were significantly different from zero. Moreover, the determinant of each correlation matrix was greater than .00001 (i.e. .009 for ASBC and .004 for SOS) and therefore indicated no severe multicollinearity (Field, 2009). Based on the tests of sampling adequacy, correlations between dimensions, and severe multicollinearity, a meaningful comparison of the factors retained for both ASBC and SOS was possible.

Conducting the exploratory factor analysis, tens factors emerged for both ASBC and SOS. However, three factors were retained for ASBC and SOS using the Kaiser (1960) criterion of analyzing factors with eigenvalues greater than one. Moreover, there was a significant drop in the eigenvalue from the third factor to subsequent factors. Next, to compare leadership criteria between ASBC and SOS, the factor loading tables for each assessment center were observed to identify which dimensions tied to each factor and to determine if there were any significant differences. **Table 3** and **Table 4** show the ASBC and SOS factor loadings, respectively, of each dimension after suppressing results less than .4 to facilitate interpretation of factor loadings and after subjecting these data to a varimax rotation. Note that the ASBC factor loadings were achieved using only 27 of 37 surveys due to lack of returned surveys or incomplete surveys.

**ASBC (n=27)**

| | Factor | | |
|---|---|---|---|
| **Dimension** | 1 | 2 | 3 |
| Conscientiousness | .874 | | |
| Idealized Influence | .832 | | |
| Honesty | .848 | | |
| Integrity | .750 | | |
| Mastery Orientation | .616 | | |
| Verbal Communication | .769 | | |
| Engagement | | .830 | |
| Effort | | .661 | |
| Counterproductive Work Behavior | | | .752 |
| Negative Affect | | | .803 |

**Table 3: Factor Loadings for ASBC**

**SOS (n=33)**

| | Factor | | |
|---|---|---|---|
| **Dimension** | 1 | 2 | 3 |
| Honesty | .539 | | |
| Developing Team Members | .800 | | |
| Verbal Communication | .653 | | |
| Selflessness | .582 | | |
| Trustworthiness | .920 | | |
| Followership | | .791 | |
| Feedback Acceptance | | .804 | |
| Introspection | | .874 | |
| Metacognitive Prompting | | .403 | .676 |
| Cognitive Adaptability | | | .801 |

**Table 4: Factor Loadings for SOS**

Together, the three retained ASBC factors explained 65.813% of the variance while the three SOS factors explained 69.883 % of the variance. **Table 5** represents the % variance explained per factor for ASBC and **Table 6** displays this information for SOS. Note that the fourth factor is shown only to highlight the significant drop in eigenvalues that occurred (and within each subsequent factor) for both ASBC and SOS.

| Factor | Eigenvalue | % of Variance | Cumulative % |
|---|---|---|---|
| 1 | 3.799 | 37.994 | 37.994 |
| 2 | 1.448 | 14.477 | 52.471 |
| 3 | 1.334 | 13.342 | 65.813 |
| 4 | .868 | 8.680 | 74.494 |

**Table 5: % Variance Explained Per Factor for ASBC**

| Factor | Eigenvalue | % of Variance | Cumulative % |
|---|---|---|---|
| 1 | 4.380 | 43.805 | 43.805 |
| 2 | 1.412 | 14.118 | 57.923 |
| 3 | 1.196 | 11.961 | 69.883 |
| 4 | .848 | 8.481 | 78.364 |

**Table 6: % Variance Explained Per Factor for SOS**

For ASBC, the dimensions that tied together will be discussed in more detail but indicated that factor 1 represents personality, factor 2 represents effort, and factor 3 represents attitude. To more accurately describe the factors that emerged for SOS, two dimensions were discarded (i.e. honesty and metacognitive prompting) due to cross loading once results less than .4 were suppressed. Thus, upon further analysis of the SOS

factors, factor 1 seemed to more appropriately represent trust, factor 2 represented accommodation, and factor 3 represented adaptability. Taken together, the leadership effectiveness criteria for the entry level managers represented by ASBC suggested that "leadership of self" is most important while "leadership of team" seems to best describe middle management leadership effectiveness criteria represented by SOS.

# V: Discussion and Conclusions

## Discussion

Many researchers have contributed studies attempting to advance the understanding of typical and maximum performance, but none have empirically or theoretically explored the leadership criteria elicited by maximum performance conditions. Moreover, none have attempted to distinguish between leadership criteria under maximum performance conditions as it relates to both entry and middle levels of management. Accordingly, this effort was designed to identify the leadership criteria that relates to both entry and middle level management.

Using the robust process outlined by Thornton and Rupp (2006) was necessary to accurately identify dimensions relevant to ASBC and SOS leadership performance. These data were elicited from qualified subject matter experts using nominal group technique and consisted of job content deemed to be an accurate representation of leadership effectiveness dimensions. The dimensions that emerged from the data were analyzed using exploratory factor analysis which revealed three factors for ASBC and three factors for SOS. In particular, researchers should take note of the top rated dimensions for ASBC and SOS and how the factors describe each level of management. In doing so, the leadership criteria for both entry and middle level managers exposed to maximum performance conditions are observed.

***Entry Level Management Leadership Criteria***

| **Personality** |
|---|
| Conscientiousness |
| Idealized Influence |
| Honesty |
| Integrity |
| Mastery Orientation |
| Verbal Communication |

**Table 7: ASBC Factor 1**

Six of the top ten ASBC dimensions are tied to factor 1 as seen in **Table 7**. A component of the well-supported Big Five personality model, conscientiousness, emerged as one of the most important factors to performance for entry level managers engaged in maximum performance. Perhaps unsurprising, this personality trait has been observed to be one of the highest contributors to "can do" performance, as elicited by maximum performance (Barrick, Mount, & Strauss, 1993; Borman, White, Pulakos, & Oppler, 1991)).

Additionally, there is a trait component of leadership that resides in the transformational leadership model described as idealized influence (Northouse, 2001). Of the "Four I's" of transformational leadership, idealized influence is described as the charismatic and role model characteristic of leadership and is what entices individuals to follow the leader (Bono & Judge, 2004; Bass & Steidlmeier, 1999). Moreover, there is a moral dimension encompassed by idealized influence whereby honesty and integrity are

considered significant contributors (Brown, Treviño, & Harrison, 2005; Bass & Steidlmeier, 1999). In other words, the traits of honesty and integrity are tied together and significantly contribute to idealized influence, or the trait leadership component of the transformational leadership model. Thus, it should not be surprising the traits of honesty, integrity, and idealized influence clustered to the same factor. Moreover, the fact that idealized influence (and thus, honesty and integrity) emerged as a top dimension of maximum performance further supports previous findings that transformational leadership is most important to maximum performance compared to typical performance (Lim et al., 2004; Ployhart et al., 2001). Additionally, there is evidence that transformation leadership has been linked to personality dimensions within the Big Five framework (Lim et al., 2004; Ployhart et al., 2001).

London and Smither (2002) define mastery orientation as when an individual's "attentional focus is on developing competence. These learners want to acquire knowledge and skill until they reach a level of mastery that reflects a deep (expert) understanding, and they view feedback about skill deficits as an opportunity for improvement" (London et al., 2002, p.83). Thus, it makes intuitive sense that mastery oriented entry level managers exposed to the maximum performance conditions of ASBC's developmental assessment center would feel a strong sense to develop competency because by definition, the experience and knowledge of entry level managers is lacking, and therefore, the desire to gain competency is intensified.

Additionally, mastery orientation is referred to as trait learning orientation due to the consistent finding that it stems from a stable personal disposition, or trait derived

from one's personality (Ward, Rogers, Byrne, & Masterson, 2004). Moreover, the conditions that Ward et al. (2004) established in their experiment were representative of maximum performance in that subjects were aware they were being evaluated, maximum effort was expected and exerted, and the evaluative period was over a short duration (30 minutes). In other words, mastery orientation—or trait learning orientation—is trait based and personality driven and has been observed to remain stable across performance and learning based situations as elicited by assessment centers like ASBC.

Finally, it should not be surprising to see verbal communication as essential to leadership effectiveness. Leadership requires the ability to communicate and influence others to achieve organizational goals. Accordingly, verbal communication was considered to be among the top criteria for leadership effectiveness for both entry and middle level managers. As a leadership dimension, verbal communication has also been referred to as speech fluency, or an ability characteristic that is trait based (Northouse, 2001).

Taken together, conscientiousness, honesty, idealized influence, integrity, mastery orientation, and verbal communication suggests that entry level managers exposed to maximum performance conditions can attribute a significant portion of their leadership effectiveness to traits, dispositional characteristics, and ability characteristics. Moreover, traits, dispositional and ability characteristics are said to comprise an individual's personality (McCrae & John, 1992; Tellegen, 1991). In other words, personality emerged as one of the most important components of performance under maximum performance conditions for entry level managers.

| Effort |
| --- |
| Engagement |
| Effort |

**Table 8: ASBC Factor 2**

The second factor that emerged at ASBC consisted of engagement and effort as seen in **Table 8**. One of the conditions of maximum performance as noted by Sackett et al. (1988) is that individuals must exert effort. Moreover, they suggest that if everyone tries hard, then effort is not a contributor to the variance. However, this dimension suggests that those who try hard (i.e. exhibit high amount of effort) will, on average, be more effective than those who do not (Fisher & Ford, 1998). Accordingly, the essence of engagement is a persistence of attentiveness and effort (Skinner & Belmont, 1993) and therefore indicates that as a whole, effort is a significant criterion to leadership effectiveness for entry level managers.

| Attitude |
| --- |
| Counterproductive Work Behavior |
| Negative Affect |

**Table 9: ASBC Factor 3**

**Table 9** highlights the third factor for ASBC in which counterproductive work behavior and negative affect tied together. Counterproductive work behavior is described

as a realized behavior that runs contrary to the goals of an organization and that may manifest itself through unsafe behavior, misuse of time and resources, and poor quality work (Sackett, 2002). Negative affect is defined as the unpleasureable engagement in activities that stems from a variety of aversive mood states (Watson, Clark, & Tellegen, 1988) which can also result in aversive behaviors (Brown, Chorpita, & Barlow, 1998). Thus, the link between counterproductive work behaviors and negative affect is a logical one and makes sense that these dimensions tied to the same factor. Considered collectively, this factor suggests a third criterion of leadership effectiveness to be attitude. More specifically, this finding suggests that a bad attitude significantly detracts from the effectiveness of a junior leader which makes sense when considering the observation that "attitudes mediate the effect of the external stimulus world on overt behavior" (Organ & Bateman, 1991, p.180). Thus, in a leadership context, a bad attitude negatively affects the disposition of others which in turn, produces undesirable behaviors indicative of poor leadership effectiveness.

### *Middle Level Management Leadership Criteria*

Similar to ASBC, SOS had three factors associated with the top rated dimensions despite discarding two dimensions due to cross loading as mentioned previously (i.e. honesty and metacognitive prompting). A discussion of the SOS factors is presented.

In the AIB model of trust (Mayer, Davis, & Shoorman, 1995), the propensity to trust depends on the trustee's ability, integrity, and benevolence. Moreover, ability, integrity, and benevolence are considered the factors of perceived trustworthiness. This concept of trust is considered the "lubricant" for high performing teams such that in its

absence, the pace of team performance grinds to a halt (Mayer et al., 1995). Thus, when viewed through the AIB framework, the factor of "trust", as displayed in **Table 10**, is explained by considering developing team members and verbal communication as abilities, selflessness as an act of benevolence, and trustworthiness as the operationalization of ability, integrity, and benevolence.

| **Trust** |
|---|
| Developing Team Members |
| Verbal Communication |
| Selflessness |
| Trustworthiness |

**Table 10: SOS Factor 1**

Zacarro, Rittman, and Marks (2001) suggest that developing team members is the ability to establish appropriate mental models that the team can use to process information and solve problems accordingly. The successful transfer of an appropriate mental model depends on the leader's ability to communicate the information used to form these mental models. Thus, it should not be surprising that the dimensions of developing team members and verbal communication both tied together as essential abilities.

Selflessness can be defined as the willingness to make sacrifices for the overall benefit of the team. For example, the willingness to put in more time than usual during peak periods of labor and at the expense of personal time can be considered exemplifying selflessness. In this sense, the individual demonstrating selflessness is acting out of benevolence for the benefit of the team.

Taken together, the SOS factor of trust is understood in the context of the Mayer et al. (1995) AIB model of trust which suggests ability (developing team members, verbal communication), integrity, and benevolence (selflessness) are integral components of trustworthiness which is the "lubricant" of team effectiveness (Mayer et al., 1995). Thus, this factor of trust was identified as one of the most important contributors to middle level management leadership effectiveness.

The second factor that emerged to describe leadership effectiveness criteria consisted of followership, introspection, and feedback acceptance. The concept of followership has come a long way since the traditional "passive subordinate" paradigm and has more recently been considered an important component of leadership. This more contemporary view acknowledges the importance of followers to organizational performance (Kelley, 2008), the role that leaders and followers play as highlighted by the leader-membership exchange theory (Graen & Uhl-Bien, 1995), and how both roles are essential to an organization such that there are times when leaders need to be good followers, and vice-versa (Litzinger & Schaefer, 1982). The other dimensions of this factor, introspection and feedback acceptance, can be better understood in terms of the feedback orientation framework (London & Smither, 2002). In this framework, seeking,

processing, and accepting the feedback are seen as parts of a behavioral changing process to increase self-awareness (i.e. introspection (Boring, 1953)) and performance. Thus, the importance of a leader to be able to enact followership and change behavior according to feedback suggests that accommodation is a necessary criterion for leadership effectiveness and is shown in **Table 11**. It is this accommodation that enables the leader to be open to conceding to others, aware of one's strengths and weaknesses, and receptive to feedback in order to become a more effective leader.

| **Accommodation** |
|---|
| Followership |
| Feedback Acceptance |
| Introspection |

**Table 11: SOS Factor 2**

The third factor consisted of only one dimension, cognitive adaptability, which reflects the ability of an individual to adapt to environmental changes and overcome constraints (Cañas, Quesada, Antolí, & Fajardo, 2003). Given the dynamic environments of organizations, it is little wonder the ability to adapt to the nuances of constraints, uncertainty, and resistance encountered by middle level managers is considered to be among the most important dimensions to possess. Thus, as **Table 12** highlights, the concept of adaptability seemed to be an appropriate criterion of leadership effectiveness for middle managers.

| Adaptability |
| --- |
| Cognitive Adaptability |

**Table 12: SOS Factor 3**

When considering the ASBC top ten leadership dimensions, the three factors that emerged can be described as personality, effort, and attitude. Personality was comprised of conscientiousness, honesty, idealized influence, integrity, mastery orientation, and verbal communication. Collectively, these traits, dispositional characteristics, and ability characteristics were representative of personality. Examined further, these personality traits suggest that this entry level manager factor is operationalized within an individual's self-control. In other words, effectiveness within this factor seems to be achieved when the individual chooses to exercise self-control measures such as trying to maintain awareness or conscientiousness, upholding a higher moral standard by being honest and acting with integrity, desiring to gain competency, and exhibiting fluency in verbal communication. The effort factor suggested that those who exert a high amount of effort and engagement will be exhibiting an important leadership effectiveness criterion for entry level managers. That is, exerting a high level of effort is important for entry level managers. Similar to the personality factor, effort is also operationalized in the individual domain and can therefore be considered a stand-alone factor. An individual controls the level of effort exerted and is not dependent on the influence of an external factor to exist. Finally, the factor of attitude consisted of counterproductive work behavior and negative affect whereby attitude has been found to drive the interaction (Organ & Bateman, 1991) and thus suggesting that attitude was important to leader

effectiveness for entry level managers. Once again, attitude is within the control of an individual and is not contingent on the interaction with an external stimulus. An individual can choose to have a good or bad attitude regardless of the individual's external environment. Considering the significant emphasis on the individual domain, the factors of personality, effort, and attitude suggest that "leadership of self" is the overarching construct describing entry level manager leadership effectiveness.

Interesting to note, the majority of the leadership criteria for middle level managers corresponded to the interaction between the individual and external stimuli—a marked contrast to the individual domain that composed the "leadership of self" criteria of entry level managers. Trust, accommodation, and adaptability emerged as the most important leadership criteria at the middle management level. Trustworthiness, verbal communication, selflessness, developing team members, followership, feedback acceptance, and cognitive adaptability are all dimensions that encapsulate the interaction of the individual and an external influence (others or the environment). For an individual to be trustworthy, he or she must be entrusted by another (the trustee), and thus an interaction between individual and another individual or a group is necessary. Additionally, the accommodation of others referred to an individual's openness to concede to others as determined through awareness of one's strengths and weaknesses, and receptivity to feedback from others. Moreover, the dimensions of followership and feedback acceptance each require reaction to the effects of others. Finally, cognitive adaptability was described as an individual's ability to adapt to changes in the external environment. Aside from introspection, which centers on an individual's awareness of

self, these results suggest the majority of the most important middle level manager dimensions are contingent on the interaction between the individual and an external influence. Accordingly, considering the heavy emphasis on the interaction of the individual domain with others, "leadership of team" seems to appropriately describe the leadership effectiveness for middle level managers. These findings are summarized in **Table 13**.

| | | | |
|---|---|---|---|
| Entry Level Managers *"Leadership of Self"* | Personality | Effort | Attitude |
| Middle Level Managers *"Leadership of Team"* | Trust | Accommodation | Adaptability |

**Table 13: Leadership Effectiveness Criteria for Entry and Middle Level Managers**

## Conclusion

An empirical study was conducted to shed light on the study of maximum performance of entry and middle levels of management. It appears this study suggests an alternative leadership skills structure for entry and middle level managers when compared to the strataplex of leadership model (Mumford, Campion, & Morgeson, 2007).

The strataplex model was built using the O*NET leadership skills database consisting of skills and job analyses developed by the U.S. Department of Labor as a means of describing work across different job domains (Mumford et al., 2007). Moreover, the strataplex was intended to compare the levels of organizational leadership

(entry, middle, senior) and how leadership skills (cognitive, interpersonal, business, and strategic) within each level varied. Cognitive skills referred to information collecting, processing, disseminating, and learning. Examples of these skills were verbal and written communication, active listening, reading comprehension, active learning, and critical thinking. Interpersonal skills were described as the ability to interact and socialize with others and included examples such as social judgment, social complexity and differentiation, human relation skills, social perceptiveness, coordination, negotiation, and persuasion. Business skills were essentially the KSAs that specifically related to the job context and included management of material and resources, procuring and allocating equipment, technology, personnel, and financial matters. Finally, strategic skills related to systems thinking as a way to understand complexity and included visioning, systems perception, identification of downstream consequences, environmental scanning, identification of key problems and root causes, and evaluation of alternative courses of action (Mumford et al., 2007).

Since the strataplex model focused on how the *set* of skills varied between each level of leadership rather than how *specific* skills varied, an exact one-to-one comparison was not accomplished. However, the emphasis on which leadership skills were observed to be most useful for entry and middle level managers was compared with the results of this study.

For entry level managers, this study highlights the importance of personality, effort, and attitude compared with the strataplex model's larger emphasis on cognitive skills followed by interpersonal, business, and strategic skills, respectively. More specifically, it appears this study's emphasis on the contributions of high effort, role

modeling (honesty, integrity, idealized influence), and attitudinal effects are obscured in the strataplex's model for entry level leadership. Moreover, the strataplex's heavy emphasis on collecting, processing, and disseminating information (cognitive) appears to have little prominence in the current study's findings. **Table 14** highlights the differences between each study for entry level leadership.

| Entry Level Leadership | |
|---|---|
| **Strataplex** | **Current Study** |
| **Cognitive Skills** | **Personality** |
| ***Emphasis: High*** | Conscientousness |
| Verbal Communication | Honesty |
| Written Communication | Idealized Influence |
| Reading Comprehension | Integrity |
| Active Listening | Mastery Orientation |
| Active Learning | Verbal Communication |
| Critical Thinking | |
| **Interpersonal Skills** | **Effort** |
| ***Emphasis: Medium Low*** | Engagement |
| Social Judgment | Effort |
| Social Complexity | |
| Human Relation Skills | **Attitude** |
| Social Perceptiveness | Counterproductive |
| Coordination | Work Behavior |
| Negotiation | Negative Affect |
| Persuasion | |
| **Business Skills** | |
| ***Emphasis: Low*** | |
| Management of resources | |
| **Strategic Skills** | |
| ***Emphasis: Low*** | |
| Visioning | |
| Systems Perception | |
| Evaluate alternatives | |

**Table 14: Strataplex Comparison of Entry Level Leadership Criteria**

Regarding middle level managers, the strataplex model's emphasis on cognitive skills seems to correspond with this study's finding of developing team members and verbal communication as it relates to collecting, processing, and communicating mental

models to others. Additionally, while this study's finding that ability to accommodate others is not explicitly observed in the strataplex model, it appears a similar consideration for others is utilized in the strataplex's composite of interpersonal skills. However, this study's emphasis on cognitive adaptability, or adaption to external factors does not appear to be as accentuated in the strataplex's model for middle level managers. **Table 15** shows the differences between each study for middle level managers.

| Middle Level Leadership | |
|---|---|
| **Strataplex** | **Current Study** |
| **Cognitive Skills** | **Trust** |
| ***Emphasis: High*** | Trustworthiness |
| Verbal Communication | Verbal Communication |
| Written Communication | Selflessness |
| Reading Comprehension | Developing Team Members |
| Active Listening | |
| Active Learning | **Accommodation** |
| Critical Thinking | Followership |
| **Interpersonal Skills** | Introspection |
| ***Emphasis: Medium Low*** | Feedback Acceptance |
| Social Judgment | |
| Social Complexity | **Adaptability** |
| Human Relation Skills | Cognitive Adaptability |
| Social Perceptiveness | |
| Coordination | |
| Negotiation | |
| Persuasion | |
| **Business Skills** | |
| ***Emphasis: Low*** | |
| Management of resources | |
| **Strategic Skills** | |
| ***Emphasis: Low*** | |
| Visioning | |
| Systems Perception | |
| Evaluate alternatives | |

**Table 15: Strataplex Comparison of Middle Level Leadership Criteria**

While the strataplex model contributes to the understanding of how different skill sets change throughout the levels of organizational leadership, it does not address how

specific skills change. This study empirically identified the most important dimensions for both entry and middle level managers under maximum performance conditions. Since the strataplex study did not highlight skills that specifically related to maximum performance, the risk of losing a degree of fidelity in the comparison is noted. However, the comparison made was only intended to determine if there were any significant differences between the two studies. As such, it appears this study uncovered additional dimensions that suggest an alternative structure of leadership effectiveness for entry and middle level managers. Nevertheless, this study's alternate findings similarly contribute to the understanding of leadership effectiveness at different levels of the organization.

**Implications**

This study benefits both researchers and practitioners alike. For researchers, a clearer understanding of leadership criteria for entry level managers (i.e. leadership of self) and middle level managers (i.e. leadership of teams) exposed to "can do" maximum performance conditions is achieved. However, this research also benefits practitioners who gain insight on matters of selection, promotion, and placement of such managers in their organization.

As a representation of entry level management leadership criteria under maximum performance conditions, this study suggests that managers who are motivated to gain competency, abide by moral principles, try hard, and have a positive attitude are demonstrating the most important antecedents of their leadership effectiveness. Additionally, the majority of the most important dimensions are within the domain of an individual and simultaneously capable of standing alone outside the effects of external

stimuli (sans idealized influence and verbal communication). Thus, the criteria of personality, effort, and attitude—or leadership of self, serve as an effective framework to lead as an entry level manager.

Regarding middle managers, one who is trustworthy and selfless, effective in developing team members, able to follow others as well as lead, accepting of feedback, and able to adapt to environmental changes will be exhibiting antecedents considered most important to this level of management. Thus, it seems the most important middle management dimensions that define the leadership effectiveness criteria of trust, accommodation, and adaptability heavily pertain to the individual's interaction with others and the environment. That is, the "leadership of teams" framework seems to appropriately capture the leadership effectiveness criteria for middle level managers exposed to maximum performance conditions. Moreover, considering that leadership is the ability to influence others to achieve organizational goals, it appears the interaction between the individual and others is representative of leadership given the leadership context in which the dimensions were formulated. That is, leadership dominates nearly all of the most important dimensions for middle level managers. In summary, leadership is a *dimension* of performance for entry level managers but *is* performance for middle level managers.

**Limitations**

Military samples have frequently been used in leadership research to include the development of common leadership assessment tools (Northouse, 2001). However, when using a military sample, the possibility that external validity can potentially be

compromised exists and thus, applicability to private sector may be jeopardized. This consideration was hoped to be mitigated given the broad range of job specialties and backgrounds of ASBC and SOS students. Nevertheless, a more diverse sample that includes appropriate representation of private sector employees might be warranted.

Although care was taken to ensure quality dimension development—a fundamental concern in which assessment centers can fall short (Lievens & Conway, 2001)—there are potential weaknesses in the method chosen to achieve this. Bias is a potential problem that tends to surface when using surveys to collect data (i.e. self-report). Collecting data through self-reports is common, practical, and sometimes the only appropriate means of data collection, especially in the organizational behavior field. Its use has been extensive (Sackett & Larson, 1990; Donaldson & Grant-Vallone, 2002) and is more than likely to remain a preferred method to gather data despite its criticism as a potential research weak point due to problems with common method bias (Campbell, 1982; Podsakoff, Organ, 1986). Although this study collected self-report data, this concern was believed to be mitigated by using a mixed methods approach and implementing a variety of remedies proposed by Podsakoff, MacKenzie, Lee, and Podsakoff (2003). For example, using both surveys and focus groups as a means of data collection reduced the potential of a contaminated process that a single method approach may be more susceptible. Accordingly, obtaining data using a mixed methods approach improves the substantiality of the data by converging findings from two methods instead of one and thus further mitigates the potential effects induced by common method bias (Creswell, 2002). Moreover, common method bias remedies were implemented to

include collecting data from numerous experts, using items derived from instructor inputs as a means of increasing both accuracy and familiarity, counterbalancing question order, implementing a time delay between sending surveys, and retaining the anonymity of those filling out the surveys were among the remedies implemented (Podsakoff et al., 2003). Employing these remedies was considered to be an effective countermeasure to mitigate the top biases associated with collecting data from experts such as anchoring, overconfidence, and availability (Keeney, et al, 1991). Additionally, given the expert population receiving the survey, it was hoped that any interpretation issue would be minimal to the content-familiar instructor sample.

Regarding the focus groups, there is additional chance that expert biases may be a factor when contributing inputs in a public forum. However, the nominal group technique was used to not only attain expert consensus, but reduce the chance for such biases to occur by enabling all contributors an equal chance to voice their inputs both individually and collectively as a group and thus, elicit a more comprehensive perspective of leadership effectiveness while avoiding groupthink (Heldman, 2005). Nevertheless, there is a potential that social desirability or undesirability of proposed performance inputs may have affected the contributions that were received. Another possible drawback to the focus group approach used was the inability to randomly select instructors to contribute to focus group discussions. Instructors, although qualified to contribute, were subordinate to their schedule availability which may have influenced the discussions.

Another potential limitation arising out of the method used to derive the leadership criteria is the issue of content validity. Although the formulation of dimensions using expert inputs was considered to be a strong indicator of appropriately developed leadership criteria, it is quite possible that the variety of data collected is an incomplete set. Therefore, it is possible the results of the exploratory factor analysis may have yielded inconclusive results. Additionally, the dimensions identified have not been exposed to reliability or validity tests. Moreover, it was assumed that the assessment center exercises were appropriately designed to elicit leadership effectiveness but perhaps this assumption should be verified through an exercise analysis.

**Future Research**

Regarding generalizability, it would be useful to compare these results with a study of private sector assessment centers that similarly identified leadership criteria under maximum performance conditions. Not only would such a study shed light on the external validity of these results, but it would provide more clarity to the applicability of leadership criteria at the less studied entry and middle management levels. Additionally, increasing the sample size and varying the source of the collected data by considering not only experts, but trainees (i.e. novices) would be an interesting exploration of the perceptual differences of leadership criteria between these sources. However, it would also be interesting to incorporate the perspective of senior level managers and compare their view of entry and middle level management leadership effectiveness with the findings of this study.

As Taylor and Small (2002) point out, one of the proposed implications of identifying maximum performance criteria is the difficulty of applying a similar degree of motivated behavior to typical performance, or day-to-day work environment. Thus, identifying leadership measures under typical performance conditions for entry or middle managers may help shed light on the ability to relate maximum performance leadership measures to typical performance leadership measures.

Furthermore, it would be beneficial to confirm the validity and reliability of the identified leadership criteria. Additionally, investigating the predictive ability of the identified leadership dimensions would be of great interest to both academics and practitioners alike. Thus, a study that establishes criterion validity would be of great use. Finally, undergoing such a process would alleviate validity concerns that surround much of the assessment center literature.

## References


Ackerman, P. L., & Humphreys, L. G. (1990). Individual differences theory in industrial and organizational psychology. In M. D. Dunnette, & L. M. Hough (Eds.), (pp. 223-282) Consulting Psychologists Press.

Anderson, K. C., & Leinhardt, G. (2002). Maps as representations: Expert novice comparison of projection understanding. *Cognition and Instruction, 20*(3), 283-321.

Arthur Jr, W., Day, E. A., McNelly, T. L., & Edens, P. S. (2003). A meta-analysis of the criterion-related validity of assessment center dimensions. *Personnel Psychology, 56*(1), 125-153.

Arthur Jr, W., Day, E. A., & Woehr, D. J. (2008). Mend it, don't end it: An alternate view of assessment center construct-related validity evidence. *Industrial and Organizational Psychology, 1*(1), 105-111.

Barrick, M. R., Mount, M. K., & Strauss, J. P. (1993). Conscientiousness and performance of sales representatives: Test of the mediating effects of goal setting. *Journal of Applied Psychology, 78*(5), 715-722.

Bartunek, J. M., & Murninghan, J. K. (1984). The nominal group technique: Expanding the basic procedure and underlying assumptions. *Group & Organization Management, 9*(3), 417.

Bass, B. M. (1998). *Transformational leadership: Industrial, military, and educational impact.* Mahwah, NJ: Lawrence Erlbaum & Associates.

Bass, B. M., & Steidlmeier, P. (1999). Ethics, character, and authentic transformational leadership behavior. *The Leadership Quarterly, 10*(2), 181-217.

Benson, M. J., & Campbell, J. P. (2007). To be, or not to be, linear: An expanded representation of personality and its relationship to leadership performance. *International Journal of Selection and Assessment, 15*(2), 232-249.

Bono, J. E., & Judge, T. A. (2004). Personality and transformational and transactional leadership: A meta-analysis. *Journal of Applied Psychology, 89*(5), 901-910.

Boring, E. G. (1953). A history of introspection. *Psychological Bulletin, 50*(3), 169-189.

Borman, W. C. (1991). Job behavior, performance, and effectiveness. In M. D. Dunnette, & L. M. Hough (Eds.), *Handbook of industrial and organizational psychology* (2nd ed., pp. 271-326). Palo Alto, CA: Consulting Psychologists Press.

Borman, W. C., & Brush, D. H. (1993). More progress toward a taxonomy of managerial performance requirements. *Human Performance, 6*(1), 1-21.

Borman, W. C., White, L. A., Pulakos, E. D., & Oppler, S. H. (1991). Models of supervisory job performance ratings. *Journal of Applied Psychology, 76*(6), 863-872.

Boudreau, W. (1991). Utility analysis in human resource management decisions. In M. D. Dunnette, & L. M. Hough (Eds.), *Handbook of industrial and organizational psychology* (2nd ed., pp. 621-745). Palo Alto, CA: Consulting Psychologists Press.

Bradley, J. P., Nicol, A. A. M., Charbonneau, D., & Meyer, J. P. (2002). Personality correlates of leadership development in canadian forces officer candidates. *Canadian Journal of Behavioural Science, 34*(2), 92-103.

Brown, M. E., Treviño, L. K., & Harrison, D. A. (2005). Ethical leadership: A social learning perspective for construct development and testing. *Organizational Behavior and Human Decision Processes, 97*(2), 117-134.

Brown, T. A., Chorpita, B. F., & Barlow, D. H. (1998). Structural relationships among dimensions of the DSM-IV anxiety and mood disorders and dimensions of negative affect, positive affect, and autonomic arousal. *Journal of Abnormal Psychology, 107,* 179-192.

Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin, 56*(8), 1-105.

Campbell, J. (1990). Modeling the performance prediction problem in industrial and organizational psychology. In M. D. Dunnette, & L. M. Hough (Eds.), *Handbook of industrial and organizational psychology* (2nd ed., pp. 687-732). Palo Alto, CA: Consulting Psychologists Press.

Campbell, J. P. (1982). Some remarks from the outgoing editor. *Journal of Applied Psychology, 67*(6), 691-700.

Campbell, J. P., McCloy, R. A., Oppler, S. H., & Sager, C. E. (1993). A theory of performance. In N. Schmitt & W.C. Borman (Eds.), *Personnel Selection in Organizations,* 35–70. San Francisco, CA: Jossey-Bass.

Campbell, J. P., McHenry, J. J., & Wise, L. L. (1990). Modeling job performance in a population of jobs. *Personnel Psychology, 43*(2), 313-575.

Cañas, J., Quesada, J., Antolí, A., & Fajardo, I. (2003). Cognitive flexibility and adaptability to environmental changes in dynamic complex problem-solving tasks. *Ergonomics, 46*(5), 482-501.

Chi, M. T. H. (2006). Two approaches to the study of experts' characteristics. In K. A. Ericsson, N. Charness & P. J. Feltovich Hoffman R.R. (Eds.), *The cambridge handbook of expertise and expert performance* (pp. 21-30). Cambridge: Cambridge University Press.

Creswell, J. W. (2002). *Research design: Qualitative, quantitative, and mixed methods approaches.* Sage Publications, Inc.

Cronbach, L. J. (1960). *Essentials of psychological testing* Harper & Row, New York.

Culbert, S. A. (1968). Trainer self-disclosure and member growth in two T groups. *The Journal of Applied Behavioral Science, 4*(1), 47.

Delbecq, A. L., & Van de Ven, A. H. (1971). A group process model for problem identification and program planning. *The Journal of Applied Behavioral Science, 7*(4), 466.

Donaldson, S. I., & Grant-Vallone, E. J. (2002). Understanding self-report bias in organizational behavior research. *Journal of Business and Psychology, 17*(2), 245-260.

DuBois, C. L. Z., Sackett, P. R., Zedeck, S., & Fogli, L. (1993). Further exploration of typical and maximum performance criteria: Definitional issues, prediction, and white-black differences. *Journal of Applied Psychology, 78*(2), 205-211.

Dunnette, M. D., Campbell, J., & Jaastad, K. (1963). The effect of group participation on brainstorming effectiveness for 2 industrial samples. *Journal of Applied Psychology, 47*(1), 30-37.

Field, A. P. (2009). *Discovering statistics using SPSS.* Thousand Oaks, CA: SAGE Publications Inc.

Fisher, S. L., & Ford, J. K. (1998). Differential effects of learner effort and goal orientation on two learning outcomes. *Personnel Psychology, 51*(2), 397-420.

Gaugler, B. B., Rosenthal, D. B., Thornton, G. C., & Bentson, C. (1987). Meta-analysis of assessment center validity. *Journal of Applied Psychology, 72*(3), 493-511.

Gitomer, D. H. (1988). Individual differences in technical troubleshooting. *Human Performance, 1*(2), 111-131.

Glaser, R. (1990). The reemergence of learning theory within instructional research. *American Psychologist, 45*(1), 29.

Graen, G. B., & Uhl-Bien, M. (1995). Relationship-based approach to leadership: Devleopment of leader-member exchange (LMX) theory of leadership over 25 years: Applying a multi-level multi-domain perspective. *The Leadership Quarterly, 6*(2), 219-247.

Guerrero, L., Gou, P., & Arnau, J. (1997). Descriptive analysis of toasted almonds: A comparison between expert and semi-trained assessors. *Journal of Sensory Studies, 12*(1), 39-54.

Guion, R. M. (1991). Personnel assessment, selection, and placement. In M. D. Dunnette, & L. M. Hough (Eds.), *Handbook of industrial and organizational psychology* (2nd ed., pp. 327-397). Palo Alto, CA: Consulting Psychologists Press.

Heldman, K. (2005). *Project manager's spotlight on risk management*. California: Jossey-Bass.

Henderson, P. L. (1976). Assessing the assessment center: New dimensions in leadership. *Air University Review, 27*(4), 47-54.

Hinds, P. J. (1999). The curse of expertise: The effects of expertise and debiasing methods on predictions of novice performance. *Journal of Experimental Psychology Applied, 5*, 205-221.

Howard, A. (2008). Making assessment centers work the way they are supposed to. *Industrial and Organizational Psychology, 1*(1), 98-104.

Kaiser, H. F. (1960). The application of electronic computers to factor analysis. *Educational and Psychological Measurement, 20*(1), 141-151.

Keeney, R. L., & Von Winterfeldt, D. (1991). Eliciting probabilities from experts in complex technical problems. *IEEE Transactions on Engineering Management, 38*(3), 191-201.

Kelley, R. E. (2008). Rethinking followership. In B. Shamir, R. Pillai, M. C. Bligh, &M.

Lance, C. E. (2008). Why assessment centers do not work the way they are supposed to. *Industrial and Organizational Psychology, 1*(1), 84-97.

Lievens, F. (2002). Trying to understand the different pieces of the construct validity puzzle of assessment centers: An examination of assessor and assessee effects. *Journal of Applied Psychology, 87*(4), 675-686.

Lievens, F., & Conway, J. M. (2001). Dimension and exercise variance in assessment center scores: A large-scale evaluation of multitrait-multimethod studies. *Journal of Applied Psychology, 86*(6), 1202-1222.

Lim, B. C., & Ployhart, R. E. (2004). Transformational leadership: Relations to the five-factor model and team performance in typical and maximum contexts. *Journal of Applied Psychology, 89*(4), 610-621.

Litzinger, W., & Schaefer, T. (1982). Leadership through followership. *Business Horizons, 25*(5), 78-81.

London, M., & Smither, J. W. (2002). Feedback orientation, feedback culture, and the longitudinal performance management process. *Human Resource Management Review, 12*(1), 81-100.

Mangos, P. M., & Arnold, R. D. (2008). Enhancing military training through the application of maximum and typical performance measurement principles. *Performance Improvement, 47*(3), 29-35.

Marcus, B., Goffin, R. D., Johnston, N. G., & Rothstein, M. G. (2007). Personality and cognitive ability as predictors of typical and maximum managerial performance. *Human Performance, 20*(3), 275-285.

Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An integrative model of organizational trust. *Academy of Management Review, 20*(3), 709-734.

McCrae, R. R., & John, O. P. (1992). An introduction to the five-factor model and its applications. *Journal of Personality, 60*(2), 175-215.

Mumford, T. V., Campion, M. A., & Morgeson, F. P. (2007). The leadership skills strataplex: Leadership skill requirements across organizational levels. *The Leadership Quarterly, 18*(2), 154-166.

Neelankavil, J. P., Mathur, A., & Zhang, Y. (2000). Determinants of managerial performance: A cross-cultural comparison of the perceptions of middle-level managers in four countries. *Journal of International Business Studies, 31*(1), 121-140.

Northouse, P. G. G., & Northouse, P. G. (2009). *Leadership: Theory and practice.* Thousand Oaks, CA: SAGE Publications Inc.

Organ, D. W., & Bateman, T. S. (1991). *Organizational behavior* (4th ed.). Homewood, IL: Irwin. 155-183.

Ployhart, R. E., Lim, B. C., & Chan, K. Y. (2001). Exploring relations between typical and maximum performance ratings and the five factor model of personality. *Personnel Psychology, 54*(4), 809-843.

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*(5), 879-903.

Podsakoff, P. M., & Organ, D. W. (1986). Self-reports in organizational research: Problems and prospects. *Journal of Management, 12*(4), 531-544.

Sackett, P. R. (2002). The structure of counterproductive work behaviors: Dimensionality and relationships with facets of job performance. *International Journal of Selection and Assessment, 10*(1 - 2), 5-11.

Sackett, P. R. (2007). Revisiting the origins of the typical-maximum performance distinction. *Human Performance, 20*(3), 179-185.

Sackett, P. R., & Larson Jr, J. R. (1990). Research strategies and tactics in industrial and organizational psychology. In M. D. Dunnette, & L. M. Hough (Eds.), *Handbook of industrial and organizational psychology* (pp. 419-489). Palo Alto, CA: Consulting Psychologists Press.

Sackett, P. R., Zedeck, S., & Fogli, L. (1988). Relations between measures of typical and maximum job-performance. *Journal of Applied Psychology, 73*(3), 482-486.

Schenk, K. D., Vitalari, N. P., & Davis, K. S. (1998). Differences between novice and expert systems analysts: What do we know and what do we do? *Journal of Management Information Systems, 15*(1), 9-50.

Scholz, G., & Schuler, H. (1993). Das nomologische netzwerk des assessment centers: Eine metaanalyse (the nomological network of the assessment center: A meta-analysis). *Organisations Psychologie, 37*(2), 73-85.

Skinner, E. A., & Belmont, M. J. (1993). Motivation in the classroom: Reciprocal effects of teacher behavior and student engagement across the school year. *Journal of Educational Psychology, 85*(4), 571.

Society for Industrial and Organizational Psychology, Inc. (2003). *Principles for the validation and use of personnel selection procedures* (4th ed.). Bowling Green, OH:

Stevens, J. (2002). *Applied multivariate statistics for the social sciences.* Mahwah, NJ: Lawrence Erlbaum Associates.

Taylor, P. J., & Small, B. (2002). Asking applicants what they would do versus what they did do: A meta-analytic comparison of situational and past behaviour employment interview questions. *Journal of Occupational and Organizational Psychology, 75*(3), 277-294.

Tellegen, A. (1991). Personality traits: Issues of definition, evidence, and assessment. In D. Cicchetti, & W. Grove (Eds.), (pp. 10–35). Minneapolis, MN: University of Minnesota Press.

Thornton, G. C., & Rupp, D. E. (2006). *Assessment centers in human resource management: Strategies for prediction, diagnosis, and development*. Mahwah, NJ: Lawrence Erlbaum Associates.

Ward, J. R., Rogers, D. A., Byrne, Z. S., & Masterson, S. S. (2004). State versus trait goal orientation: Is there truly a difference. Paper presented at *The 19th Annual Conference of the Society of Industrial and Organizational Psychology in Chicago, Illinois on April 2-4, 2004.*

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*(6), 1063-1070.

Zaccaro, S. J., Rittman, A. L., & Marks, M. A. (2001). Team leadership. *The Leadership Quarterly, 12*(4), 451-483.

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**14. ABSTRACT**

Since the seminal work investigating the relationship between typical and maximum performance by Sackett, Zedeck, and Fogli in 1988, there has been a marked increase in research in this area. Although much research has furthered the relationship between typical and maximum performance, none have attempted to identify which leadership effectiveness criteria are considered most important to an individual's maximum performance, or assessment of one's potential. Thus, this empirical study seeks to identify the leadership effectiveness criteria under maximum performance conditions as it relates to entry and middle level managers. Using an exploratory factor analysis, the results suggest an interesting comparison of leadership criteria between entry and middle management engaged in maximum performance. For entry level managers, personality, effort, and attitude emerged as the most important factors for entry level managers suggesting that "leadership of self" is the pathway to being an effective leader. However, for middle level managers, trust, accommodation, and adaptability were considered essential leadership effectiveness criteria indicating "leadership of team" is an appropriate framework at this level.

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